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Sub-clinical Helminthiasis of Farm Animals*

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In response to your very kind invitation to open a discussion on some aspect of parasitic disease among farm animals, I have chosen to deal with the less obvious but economically more important forms of disease caused by parasitic helminths. The term "Sub-clinical Helminthiasis" may be defined as a condition of poor thriving brought about by helminthic infestation, a state on the line bordering between health and disease, wherein the vigorous growth of young animals is arrested and the bloom goes off those that have reached maturity.

Prior to the discovery of the microbial origin of many epidemic diseases the parasitic worms were regarded as exceedingly pathogenic, and it has been one of the results of the development of bacteriology that the relative importance of parasitic worms, as generally accepted by workers in medical and veterinary science, has diminished; so that at the present time some of these parasites are actually regarded as "normal inhabitants" of the animals in which they are found. This new attitude was very pertinently criticised by Hall, the well-known American Parasitologist, who decried it as an "adjustment to parasitism," and as a "philosophy that is willing to compromise with parasites," as opposed to the "philosophy that teaches that parasites are injurious and must be destroyed." He quotes, as an example of this parasitological defeatism, a contributor to the literature who refers to parasitism as a state of equilibrium between the members of a complex, a state that we in our management of animals should seek to maintain since it appears to be the solution to the parasite problem which Nature herself adopts. Hall then described two groups of widely divergent thought on the subject of parasite control, the one regarding parasites as "often harmful and always dangerous," and the other as "normal inhabitants of healthy animals, occasionally associated with disease."

That there are grave dangers in a complacent attitude towards parasitic worms it would be foolish to deny, and the man who attempts to rear domestic animals and birds without due regard to the avoidance of the ever-present danger from parasitic worms is likely to witness an ocular demonstration of the most convincing kind. But perhaps it is only for the purpose of argument that we should wish to associate ourselves with either the one school of thought or the other, and when endeavouring to arrive at some approximation to the truth we ought to take both attitudes into consideration.

One of the first steps in an attempt to arrive at a rational idea on the harmful nature of parasitic worms is to get rid of what, for want of a better term, may be called the "emotional" attitude towards these creatures. The study of man's psychological processes has revealed much that is surprising, and among the strange conclusions to which we are driven is one that man, far from being a *rational* animal, is a creature of emotions and prejudice, his thoughts and actions being largely governed by feelings. There is ample justification for supposing that an emotional attitude towards parasitic worms has played an important rôle in evaluating the position of these parasites with regard to the cause of disease. Parasitic worms are popularly regarded as revolting creatures, their unnaturally white colour and their snake-like wriggling doubtless contributing to this human reaction—moreover, many of them live in unpleasant material inside the intestine, even inside the intestine of a man! Among the ordinary members of civilised communities it is only the hardy ones who dare consider tapeworms at all, the rest keeping all thoughts of them, along with a small collection of other unmentionable and unthinkable things, incompatible with our civilised state, in the background of their consciousness.

It may not be carrying this idea too far to suppose that the emotional attitude towards parasitic worms has also exerted some influence over the judgment of medical and veterinary practitioners with regard to the pathological significance of helminthic parasitism, and it is certain that the manufacturers of anthelmintics for use in pet dogs and cats derive considerable benefit from the emotional shock that occasionally comes to the pet owner when he, or more especially "she," observes *Toxocara* writhing on the lawn, or *Taenia* trailing on the pavement, and associates these horrors with the pure inside of her darling dog.

In trying to get the true perspective of this sub-clinical helminthiasis we must begin to think of it as somewhere between the two extremes of *fatal infestation* on the one hand, and *harmless commensalism* on the other. Differences of expert opinion do not arise over the matter of advanced helminthiasis; the effects are obvious enough then to lead all competent judges to the same conclusion. The anaemia, weakness and diarrhoea associated with advanced fascioliasis, the unmistakable symptoms of gid in sheep or of gapes in poultry, the frequently repeated spasmodic cough of animals suffering from parasitic bronchitis, or the anaemia, emaciation, weakness and diarrhoea seen in parasitic gastritis of ruminants and strongylosis of equines: these symptoms, associated with the finding of large numbers of worms at *post-mortem* examination, or the presence of numerous eggs in the faeces are usually sufficient to convince anyone of the causal relationship of the parasites to the disease.

On the other hand are the cases of very small numbers of relatively insignificant parasites about which there is also likely to be little difference of opinion; such an infestation as of five or ten *Capillaria* in a sheep, or as many *Bunostomum* spp. in a large pig is not likely to be regarded as significant, although among those veterinary practitioners who rarely look for parasitic worms in carrying out a *post-mortem* examination, the finding of half a dozen ascarid worms in a dog or in a pig that has died from some unknown cause, may lead to the serious consideration of their being associated with the death of the animal.

The main difficulty arises, however, over the determination of pathogenicity in infestations of intermediate degree. But before proceeding to consider these, in so far as they affect farm animals, it will be advantageous to call attention to the influence of the life-histories of the parasites over the epidemiology of the helminthic diseases with which they may be associated. The outstanding difference in this respect concerns the requirement, or no requirement, as the case may be, for an intermediate host to intervene in the course of the development of the parasite. In discussing this point, the Russian helminthologist Skrjabin introduced two new terms, using the word "geohelminthiases" for the diseases caused by parasites, the infective and preinfective stages of which merely pass from the host to the earth and back again; and "biohelminthiases" for conditions in which intermediate hosts are involved, and the factors governing the increase or movements of the intermediate have an important bearing on the disease. Such is the case in fascioliasis where some factor governing the migration of a water snail on to part of a pasture may lead to acute disease, quite apart from intensive grazing of the pasture: or at the end of a long spring drought, when warm and wet weather at last arrives and earthworms carrying an infection of the gapeworm *Syngamus trachea* may migrate *en masse* to the surface and bring about a sudden outbreak of fatal disease among chickens or pheasants, even where the ground has been free from these birds during the preceding three or four years.

On account of the complication involved by the introduction of the intermediate host, therefore, the biohelminthiases are more likely to make a sudden and acute onset, are subject to greater fluctuations in their prevalence and severity, and are less obviously linked with the concentration of the animals on the ground. Nevertheless sub-clinical helminthiases not infrequently occur as a result of infestation with some of the parasites in this group, fascioliasis being one of the most prominent at the present time. Observations which have been been made at certain abattoirs in the United States showed that 37 per cent. of the livers of all cattle slaughtered there had to be condemned on account of liver-fluke infestations. Interesting figures recently collected by Professor Leiper at abattoirs in this country show that our losses are not less than they are in America and it becomes obvious that sub-clinical fascioliasis is an important problem here. If thousands of livers have been condemned on account of pathological changes that have occurred in them, it is certain that the thousands of cattle to which those livers previously belonged must have suffered loss of vitality and perhaps considerable decrease in their growth rate as a result of the dysfunction of the organ; and that thousands of dairy cattle, which do not appear in the abattoir records, must have suffered a drop in their milk yield.

* Presented to the meeting of the North Wales Division, N.V.M.A., held at Llandudno, June 19th, 1942.

Other conditions of parasitism that may well be grouped with the important sub-clinical biohelminthiases are infestations of the metastrongylid lungworms of sheep and the lungworms of pigs. As yet, however, the extent of the damage to which these parasites can give rise, apart from the obvious pulmonary disease caused by heavy infestations, has not been investigated; but it is not improbable that, were it to be investigated, or could the meat inspectors provide us with figures similar to those which have been recorded for fascioliases we should be able to recognise one of the major causes of poor thriving among pigs kept in the open and, more particularly, among adult sheep.

Coming now to the group of geohelminthiases associated with the ordinary grazing of farm animals: parasitic gastritis in sheep and cattle, red-worm disease in horses, and husk in sheep and cattle, we shall find, on enquiry, that sub-clinical infestation with this group of parasites is of the greatest importance to agriculture in Great Britain. The parasites responsible for these diseases, with the possible exception of husk, are present wherever the relative stock are kept. The grazing animals live under what, for carnivores, we should regard as the most unhygienic of all conditions, in that their excrement continually falls on to their own food, so that increase of infestation is the simple summation of the effect of worms' eggs falling on to the pasture and infective larvae being picked up again by the grazing animals, after a suitable period for larval development.

Under certain circumstances this round of reinfestation leads to a rapid increase of the parasites, where the conditions requisite for their development are optimal; but at other times the worm population may remain at a standstill, or even diminish, as a result of unsuitable environment for the parasitic growth, or for the development of the free-living larvae, or both, the factors concerning which have been discussed at length elsewhere. These conditions, in so far as they concern the weather, are beyond the farmer's control; other factors, however, are controllable and a number of grazing practices have become established through trial-and-error observations, whereby the farmer is able to do something, at least, towards the limitation of worm increase. One of the first essential requirements for successful stock raising is to strike a suitable balance between the amount of pasture and the amount of stock to graze it, the concentration of stock being limited by the certainty of worm disease appearing should the stock become too numerous. This limit differs very considerably on different farms and with different breeds of stock that are grazed there, and every good farmer knows the limit to which he may safely go. Since, however, he wishes to make as much money as possible he usually stocks his farm to the utmost and may be said always to be farming on the borderline of epidemic helminthic disease. The weather, unfortunately, also has a very powerful influence over the development of the infective larvae and their acquisition by the grazing animal, so that unusual droughts or paucity of pasture from some other cause are liable at any time to upset the sheep farmers' calculations; and this may frequently be seen to occur throughout a large district, and sometimes throughout the whole of the country, as was seen in 1933 and 1934 when clinical worm disease appeared in widespread epidemic form.

The adaptability of many parasitic worms to their hosts is one of the most amazing things about them, even more perfect than that of the microscopical parasites responsible for tuberculosis or contagious abortion in cattle, which may harbour these parasites for a long time before their presence is finally detected through the manifestation of symptoms. Roberts, who made a survey of the helminthic fauna of the alimentary tract of 237 apparently healthy adult Australian cattle, found infestations of various parasitic worms ranging up to 2,500 *Haemonchus contortus*, 7,500 *Ostertagia ostertagi*, 13,500 *Trichostrongylus axei*, 10,000 *Cooperia punctata*, and 32,600 *Strongyloides*. A similar series of observations was made in Canadian sheep by Fallis, who found infestations of nematodes in 144 lambs, taken at random in the public abattoir, to vary between 50 and 22,788; with an average of 4,296 per lamb. Similarly, in an examination of the helminthic infestation of a number of American horses, Foster found 59 of these animals between the ages of 9 and 15 years to carry an average of 1,219 strongyloid worms each and 27 horses between the ages of 16 and 30 years to be carrying an average infestation of 205. In this country Robertson found infestations in fat lambs ranging up to 6,000 and 7,000 worms and Morgan and Corner actually recorded an infestation of 30,000 worms, mostly belonging to the genus *Nematodirus*, in an apparently normal lamb. This worm, however, is generally recognised as one of the least pathogenic of the group of trichstrongylid worms to which it belongs. It is clear that in this branch of helminthology we have to accustom ourselves to thinking in thousands, just as the bacteriologists think in millions.

A second amazing point concerning strongyloid infestation in grazing animals is the rate of the contamination of pastures and of reinfestation of the animals. Observations show that an ordinarily infested sheep may pass some 800,000 eggs per day on to the pasture, so that a heavily grazed pasture thereby increases its contamination at the rate of some 3,000,000 eggs per acre per day. If all of these eggs were successful in reaching the infective larval stage the rate of intake would be sufficient to set up parasitic gastritis within a very short time. Happily, however, most of the eggs and young larvae perish before reaching the infective state; nevertheless, the infestation of a rich pasture towards the end of the summer—a pasture that may be still maintaining lambs that are free from clinical symptoms of parasitic gastritis—often reaches some 300 or 400 infective larvae per pound of herbage, representing an intake of no less than 4,500 larvae per lamb per day.

The recording of these numbers and of the extraordinary tolerance of the host for these parasites reveals the difficulties of the diagnosis of the diseases which they cause. We must also beware of falling into the trap of diagnosis by numbers, a kind of mechanical simplicity to which biological and pathological processes cannot be made to conform; and be content, for the present, to make our decisions on a broader and less exact basis, using the art of our calling, if one may be allowed the term, as well as the science, since it is clear that the amount of disturbance to physiological function in the host animal, and the ease with which it is brought about by the parasites is one of the outstanding variables with which we have to deal.

With regard to the number of parasites and the causation of disease, only two points appear to be certain at the present time: (*a*) that a small number of parasites cause no appreciable disturbance whatever, and (*b*) that a very large number cause severe clinical disease and death. Presumably we shall not be far wrong if we suppose that the collection of infective larvae by the susceptible host animal proceeds at a relatively slow pace during the early part of the summer, and that the growth of the animal continues to be normal up to a certain degree of infestation only. Beyond that point the parasites are sufficiently numerous to cause a depression in the normal function of the organs of the host and the growth rate declines. This state, presumably, continues for some time when, owing to greater numbers of parasites and greater effect produced, the tissues begin to concern themselves with repair and the elimination of toxic products, and pathological conditions set in, when at last, all that has been happening for weeks and months beforehand becomes obvious to the farmer. The important point is that a great loss has occurred before anyone is aware of it: just as a skilful Chancellor of the Exchequer bleeds the populace without upsetting the internal economy of the country, so the skilful parasite may drain the resources of its host without deranging the physiological processes that represent a normal existence, and may do so to an extent that can only be made apparent by careful observation.

The protracted stage of the impaired normal function which represents subclinical helminthiasis prior to the onset of pathological changes is represented in the field by a state of poor thriving that is by no means uncommon; in fact, in so far as it applies to sheep and to young cattle, this state is of such prevalent occurrence that owners of sheep and cattle appear to regard an occasional lean year as one of the ordinary vicissitudes of the stock-raiser's career. I know of no experiment which has been carried out to demonstrate the point to the satisfaction of all and sundry, but it must be clear to those who have worked on parasitic gastritis, at least, that the sub-clinical phase of this disease is capable of persisting for a period of weeks or months. Small doses of infective larvae have been given to lambs indoors, and outdoor lambs have been crowded into a small amount of pasture at Weybridge in order to set up parasitic gastritis, but on more than one occasion these methods have resulted only in a stunting of the growth of the lambs and the production of the typical "bad doers" so well known to the shepherd. On *post-mortem* examination these were found to carry a large number of worms, although they had at no time shown the generally recognised symptoms of parasitic gastritis.

Nutrition is known to have important bearings on parasitism and there is ample evidence to show its paramount importance in the development and persistence of the sub-clinical form that we are discussing. Some laboratory experiments on small animals have shown that in order to produce an increased susceptibility the nutritional deficiencies must be great enough to interfere with the normal rate of growth or maintenance of an animal; an observation which might be thought to minimise the importance of the nutritional state as a factor under agricultural conditions. The factor is not, however, disqualified on these grounds as a practical explanation for the periodic appearance of sub-clinical parasitism, since grazing animals are frequently mantained under conditions of semi-starvation. One of the great difficulties with which the grazier has to contend is the fluctuation in the rate of the growth of grass, a variation which is only equalled by that of its nutritional value. In some seasons, therefore, particularly in the spring, a farmer may have more grass than he knows what to do with, but

in the late summer and autumn may find his pastures eaten down "as bare as a board" and be forced to supplement with dry food in order to prevent actual starvation. Mr. Lyle Stewart informs me that he has observed some of the ewes in the Cheviot Hills to lose as much as one-fifth, and hoggs to lose one-quarter of their weight during the winter months.

There can be no doubt that a state of semi-starvation of this kind must play an important part in parasitic gastritis, and in husk, among young cattle, not only while they are actually on the pasture, but also when they are housed during the winter months and a shortage of feeding-stuffs again enforces the farmer to maintain the store animals on the border-line of starvation. Under good feeding conditions such animals, removed from the source of re-infestation, as they are when housed, would normally throw off their parasites, but they are quite unable to do so when in a state of poor nutrition, and they degenerate into "bad doers" and "screws," or even find their way to the knacker's yard.

Ross has described similar effects in Australian sheep where there is an occurrence of a seasonal nutritional stress that is often sufficient to break down the sheep's resistance to *Haemonchus* infestation so that control efforts are complicated by the recurrence of the susceptibility to haemonchosis in adult sheep. He states that in the mountainous regions of Australia the sheep often lose a large proportion of their weight during the autumn and winter. There can be little doubt that sub-clinical parasitism is widespread under those conditions. Passing mention might also be made of an observation of Chandler's on a similar effect in the human being, concerning hookworm disease in India, where the infestation of many individuals was found to drop rapidly after they had been put into jail, on account of the improvement in their dietary condition, which came about as soon as they were placed on the prison rations.

Further evidence of sub-clinical parasitism, should it be required, comes from the improvement which has been observed to follow anthelmintic treatment among sheep in a poor thriving condition, but not obviously diseased. Such instances must have frequently come into the experience of all who have had to deal with sheep, and a good example recently came to my notice in the treatment of some eighty poorly thriving lambs on the Romney Marsh which, as a result of adequate anthelmintic treatment, put on more than five pounds per head over and above that of forty control lambs belonging to the same original group, although symptoms of parasitic gastritis as ordinarily understood, had not made their appearance.

Similar improvement has also been observed among army horses following the routine anthelmintic treatment that has been carried out in the R.A.V.C., where animals which carried only a moderate infestation showed marked improvement as a result of the treatment. Here again, presumably, the parasites were not sufficiently numerous to initiate destruction of organs, or a change over from physiological to pathological processes, but were adequate for the impairment of normal function and the production of the state of sub-clinical parasitism that is under consideration.

A similarly good effect has been reported as a result of anthelmintic treatment for ascariasis in pigs, although the evidence for this does not appear to be so satisfactory as in the previous instances.

Summing up, then, we must conclude that owing to the great variations in the quantity and nutritive value of pasture herbage, and the changeability of British weather, our agricultural grazing animals are frequently maintained at a very low nutritional ebb. Certain parasitic worms which are invariably present become numerous under these conditions and bring about a physical state of poor-thriving that, once established, cannot be cured by dietary improvements alone. This state of sub-clinical parasitism may continue for weeks, and even for months, unless anthelmintic treatment is instituted. It is a condition that is very prevalent among autumn and winter lambs—one that frequently prevents the autumn sale of lambs and necessitates keeping them until the following spring; it is also prevalent among store cattle, and is well known to horse breeders throughout the country.

Considered from the standpoint of the individual farmer the sub-clinical form of helminthiasis is a cause of very considerable, and often of recurrent, loss. As the farmer does nothing about it other than maintain a hopeful outlook it is an excellent example of the "philosophical adaptation" to which Hall referred. Considered from a national standpoint, however, it is a much more serious matter than the outbreaks of acute parasitic disease, which are rare in comparison; it represents the loss of an enormous amount of mutton, beef and milk and is an outstanding example of the lack of co-operation between agriculture and veterinary science that has existed up to the present time. What, then, can we do to diminish the danger and decrease the loss? Sir George Stapledon has done a tremendous work in opening the way to the improvement of our pastures so that more stock may be carried per acre; but of what use will that be if the drive of war-time agriculture so decreases the area of available pasture that the concentration of stock is increased beyond the limits of safety? Already there is evidence that this is coming about and it behoves us to do whatever can be done to inform the farmer of the cause of this poor thriving, to advise him of all aids to the prevention of the dangerous increase of parasitic worms, and to prescribe proper preventive as well as curative anthelmintic treatment.

Within recent years the copper-sulphate and nicotine-sulphate treatment has been used in this country with considerable success, and more recently phenothiazine has proved even more successful so that we are now able to expel the worms. These substances are widely used to treat the outbreaks of disease that are obvious enough for the farmer to see, but we should proceed beyond the stage of the treatment of each individual outbreak as it occurs and urge the prophylactic use of anthelmintic drugs much more widely. The efficient employment of such measures would doubtless mean the saving of hundreds of thousands of pounds of mutton and beef to the country.

Discussion

A long and interesting discussion ensued though, as the essayist later remarked, this tended to centre round clinical parasitic gastritis rather than the sub-clinical phase which had been discussed in his paper.

Mr. Salusbury remarked that the gap between the knowledge of helminthology and the application of preventive measures was a very great one. There was the difficulty of approach to and persuasion of the farmer. Might it not be a possibility that the Survey Scheme be enlarged and extended to include prevention and control of parasitic disease?

Mr. Forker, referring to the difficulty of contacting the farmer to advocate preventive measures during the sub-clinical phase, remarked that the National Farmers' Union had a Diseases of Animals Committee. Would it not be advisable to have veterinary advice available at these meetings, so that schemes for preventive treatment could be advocated?

Mr. Bowen wondered if there was any relationship between parasites and the condition of anoestrus in young heifers, which had shown a serious increase in recent years. Was it perhaps due to the "derangement of function" mentioned by the essayist as a result of sub-clinical parasitism?

Mr. Llewelyn-Jones agreed that there had been a serious increase in anoestrus in young heifers but his own experience had not suggested that there could be any connection between this condition and parasitism.

In the treatment of poor thriving in young cattle he used a mineral mixture recommended by Brown, of Invergordon, and had had very good results.

Other members who contributed to the discussion were Capt. Leyshon, Messrs. Wynne-Williams, W. O. Jones, W. Hughes, L. F. Robertson, W. Forgrave, A. Sutherland, R. L. Lewis, W. T. Rowlands and H. E. Harbour, and numerous questions were asked.

Replying to the various points raised, Dr. Taylor said that he had had close association with phenothiazine since it was first used. Early results in sheep and especially in horses were very successful. There was very little experimental evidence regarding its use in cattle.

On the question of over-stocking with sheep it was certain that there would be less likelihood of parasitic gastritis if stocking of sheep was reduced, but it would still be worth while dosing. There was great variation in pasture herbage, the nutritive value of which was less at the end of the summer—and this was the danger period. Towards the end of the summer lambs would, however, be more resistant to the parasites. Much work had been done on immunity but it was not possible now to go deeply into the question; generally speaking, however, immunity to parasites followed similar lines to immunity to bacteria. With some worms a good immunity was established, with others parasitism might easily recur.

The occurrence of parasitic gastritis in cattle in the spring was of particular interest as he had not come across it in other parts of the country. Diagnosis was important. Faeces counts certainly gave variable results but were, nevertheless, a valuable guide. There was, however, nothing to compare with a *post-mortem* examination for accurate diagnosis. Was it not possible that some of these young cattle put out on to very fresh young spring grass scoured owing to nutritional causes?

With regard to the reports of poor results with phenothiazine in young horses he would be interested to hear whether actual toxic symptoms had been noted or whether there was merely lack of effect. He had been asked what was the toxic dose of phenothiazine. It was true that occasional cases of intoxication occurred but these followed ordinary anthelmintic doses. As much as 500 grammes had been given experimentally in individual cases without ill effect. Pharmacologists referred to the toxic effect of phenothiazine in rare cases as a "peculiar susceptibility" rather than an "idiosyncrasy," which term was reserved for something different. The peculiar susceptibility was extreme in some instances, however; in one case, for instance, a seven-year-old horse died after receiving only 25 grammes: the symptoms, however, were those of overdosing, whereas a true idiosyncrasy would result in different symptoms altogether. Generally speaking, 30 grammes was a useful dose for the horse and thousands of horses had been treated successfully. The occasional toxic effect of the drug might be regarded as of the same nature as the carbon tetrachloride poisoning in sheep.

In cattle there had been very few controlled experiments. He wondered whether wrong diagnosis might account for many of the apparent failures. He, personally, would prefer phenothiazine to the copper-nicotine mixture for cattle, that mixture frequently giving rise to alarming symptoms of intoxication immediately after its administration.

The treatment of land for the killing of larvae had been very thoroughly investigated but almost finally given up. The infective stages were enclosed in two very tough skins and responded to no substance yet known which might be applied to pastures. His figures regarding the discharge of eggs on to a pasture had been queried. While his figures might very well indicate heavy stocking as applied to many North Wales pastures, it should be noted that in the Romney Marshes some of the pastures would carry as many as six or eight sheep per acre right through the summer months.

Regarding "husk," he agreed that intra-tracheal injections were of little or no value. Any reputation they had was more likely to be due to the good effect of removal of the animal from infected pastures and improvement in their feeding usually effected at the same time. In the prevention of husk mixed grazing was of great value—healthy adult cattle are nearly immune and could be put on the infected pastures to clear them in all except the instances of the heaviest infestation.

One speaker had mentioned mineral deficiency. Some of the work on "pining" had suggested an association between nutritional deficiency and multiplication of worms. A question had been asked on the subject of viability of larvae. Those

(*Concluded at foot of col.* 1, *p.* 380)

CLINICAL COMMUNICATION

Copper Sulphate Tolerance of Sheep

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I recently attended sheep which were wasting and had diarrhoea and showed the usual clinical symptoms of parasitic gastritis. The flock consisted of 100 fatting Welsh cross-bred lambs which were folded on 50 acres of low-lying grazing land which the previous year had been used for a flock of fifty sheep. Prior to this the land had not been used for sheep for very many years.

Ten of the poorest lambs were folded, dosed with a full dose of phenothiazine and subsequently trough fed, but little or no improvement, apart from that which would normally be attributed to the change in feeding, was noted.

The remainder of the flock became progressively worse. Diarrhoea, although present, was not severe. The lambs were brought up at night and trough fed, but little or no improvement was effected.

It was then decided to dose all the flock with a 1 per cent. solution of copper sulphate, each lamb to receive about 3 ozs. of the solution (*i.e.*, 14½ grains copper sulphate). Owing to an error in dilution, however, a 2 per cent. solution was given and each lamb received approximately 29 grains of the drug. The usual period of fasting and withholding water before and after dosing was observed. The results were spectacular. Within one hour of being dosed the animals began to pass large numbers of tapeworms and thereafter recovery was rapid, the flock improved in condition, and within a comparatively short time the animals were sold as fat lambs.

Tapeworms in sheep are of the species Monezia and the agents used for taenia are ineffective. The usual treatment for tapeworm in sheep is a mixture of copper sulphate and arsenic, although in America copper sulphate alone is quite frequently used with apparently good results.

Veterinary practitioners are normally careful to avoid exceeding the usually accepted doses of copper sulphate, when treating sheep, on account of the risk of poisoning, but this risk would appear to be over emphasised when copper sulphate alone is used. Careful dosage is, of course, a prime necessity when arsenic or mixtures of copper sulphate and arsenic are used.

Copper sulphate appears to be well tolerated by sheep and doses up to 60 grains and even higher were given by Theiler in South Africa to adult sheep, without adverse effects.

* Reported to the Central Veterinary Society, June 4th, 1942.

Weekly Wisdom

"... *We deprecate the arrangement which appears to have obtained hitherto under which the* [*Research*] *Institute, although ultimately under the same Governing Body as the* [*Royal Veterinary*] *College* [*London*], *has carried out its work as a separate unit, to the mutual disadvantage of both. The closest relationship should exist between the two, not only by reason of the 'inspiration' which research gives to teaching, but because a teacher is not likely to induce even the best type of student to consider the possibility of scientific investigation as a career unless he himself is actively engaged in research. Otherwise he fails to infect his students with enthusiasm to increase the bounds of knowledge, and as a consequence the next generation lacks capable investigators. . . .*"—Report of the Departmental Committee on the Reconstruction of the Royal Veterinary College (Chairman, Sir Charles Martin), 1929.

larvae which had climbed high on the herbage died very quickly and these formed the majority in the herbage, so that there was a rapid decline of infective larvae on the pasture. Those which had found a more sheltered position, however, might persist for 12 months.

Differential diagnosis of husk worm was made by demonstrating the larvae in the faeces by the ordinary methods of faecal examination. In the case of sheep a pellet could be placed in water, when the larvae readily migrated into the water.

Pressed to give details of dosage of phenothiazine, Dr. Taylor gave the following suggested doses :—

Horse	30 to 45 grammes
Sheep	20 to 30 "
Cattle	30 to 60 "
Pigs	Not advised.

Replying to a further question, the essayist explained that cattle became relatively resistant to husk at the age of two years. After a further year they became almost completely resistant. A few cases of husk did occur in adult cattle and these were due to special circumstances allowing an unusually massive intake of infective larvae.

ABSTRACTS

[CRYSTAL VIOLET VACCINE FOR THE PREVENTION OF SWINE FEVER. Doyle, T. M. (1942.) *Vet. J.* **98**. 51-64. (10 refs.).]

A summary of findings of workers (principally American) is given, the methods of preparation of vaccine adopted by the author being those of McBryde and Cole. Their original method consisted of incubating for 14 days at 37·5° C. a mixture of phenolised, defibrinated swine fever-infected blood and crystal-violet solution. In the modified method, phenol was replaced by sodium phosphate. Strains of virus for vaccine preparation and testing were obtained from America. The author shows that vaccine becomes inactivated about the third day of incubation, 14 days' incubation giving a wide margin of safety. No pig showed any reaction as a result of vaccination though immediately following vaccination there is a hypersusceptible phase, immunity being developed by the twelfth day. The author considers vaccination contraindicated in herds which may be infected. Of four vaccines prepared by the original method two were useless, while one of the two which were satisfactory was found to be as good as that prepared from the same swine fever blood by the modified method. Satisfactory results were given by 16 lots of vaccine prepared by the modified method. Of 206 pigs vaccinated with doses varying from 2 to 10 c.c., 201 were adequately protected while all 80 controls died. Twelve lots of modified virus were used in this test. In one instance citrated swine fever blood was used to prepare vaccine which gave good results even after 408 days in the cold room.

Vaccine prepared from English " field " virus protected two-thirds of the pigs when subsequently inoculated with homologous virus, though it gave no protection against American virus. Vaccine from American virus protected pigs against " field " virus in five English outbreaks from four counties.

Tests of vaccinated pigs both by inoculation and contact showed that immunity lasts more than nine or ten months. Pigs kept in contact with vaccinated animals showed no reaction, subsequent inoculation with virus proving them to have remained susceptible.

Doyle considers that the antigenic action of vaccine depends on the virus content of the swine fever blood used which cannot be titrated owing to absence of suitable small animals and high cost of pigs.

A. W. G.

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[VETERINARY INSPECTION OF MEAT, MEAT FOODS AND DAIRY PRODUCTS CONSUMED BY THE ARMY. Waters, F. C. (1942.) *J. Amer. vet. med. Ass.* **100**. 301-304.]

The veterinary Corps of the U.S. Army is an integral part of the Medical Department and performs two important functions : it maintains the health and efficiency of army animals and conducts the inspection of meat and dairy products. With the increasing mechanisation of the army the latter function has become the more important of the two.

In 1802 the French army introduced a system of canning meat. Only meat which has been inspected by the Bureau of Animal Industry is accepted by the U.S. Army and the whole canning process is then supervised by the Veterinary Corps who also grade the meat and allocate it for various purposes. Experiments are being carried out on new methods of preserving and transporting meat to save shipping space.

In order to prevent the dissatisfaction which would arise if inspection were not standardised throughout the country a School of Meat and Dairy Hygiene for Veterinary Officers has been established at the Chicago Quartermaster's Depot.

The U.S. Army Veterinary Service realise that in these days of mechanisation their chief task is the very important one of ensuring a supply of good quality food for the armed forces of the United States. To carry out this function they are building up a well-trained scientific staff.

J. F.

TREATMENT OF BURNS

In 1940 the Ministry of Health distributed to householders a leaflet entitled " First Aid in Brief," in which instructions were given on the immediate treatment of wounds and burns. Recently a modification in the paragraph dealing with burns has been made. The Ministry ask that the following advice be substituted : " Tannic acid jelly should not be used as first-aid treatment for anything except minor burns. It must *never* be applied to the face in the neighbourhood of the eyes or to the hands or fingers, as it tends to contract the skin. Patients with extensive burns should be sent to hospital at the earliest possible moment. The clothing should not be disturbed so as to expose the burn, and such burn areas as are already exposed should be covered with dry, clean dressings or with sterile vaseline gauze if this is available."

REPORT

[ASSAM. Adminstrative Report of the Civil Veterinary Department for the Year 1940-41.]

The annual administrative report of the Civil Veterinary Department, Assam, for the year 1940-41 is a record of steady progress of the Veterinary Department of this province in the control and investigation of disease amongst livestock.

There was an increase in the number of stipendiary students being trained at the Bengal Veterinary College and the number of veterinary assistants trained at local veterinary hospitals has again been increased.

The incidence and mortality of rinderpest was considerably less than during the previous years and this is attributed to the extensive use of goat tissue vaccine for the control of this disease. It is stated that nearly one-quarter of the total cattle population of the province has now been actively immunised against rinderpest by this method.

The mortality from anthrax, haemorrhagic septicaemia and black-quarter was markedly reduced as compared with that of previous years.

The number of cases treated at veterinary hospitals was increased and the treatment of non-contagious disease amongst livestock by itinerant veterinary assistant surgeons was on a much larger scale.

The number of stud bulls was augmented, but is still very small compared with the total number required, and the number of buffalo stud bulls, though small, was considerably increased.

The Veterinary Investigation Officer continued to carry on systematic investigations into the diseases of livestock, particularly in regard o bovine contagious pleuro-pneumonia, kumri in horses, Johne's disease, salmonellosis in pigeons, chemotherapy of hump sore, helminthiasis in calves and ear sore in buffaloes. In collaboration with the Mukteswar Research Institute, special attention was given to contagious bovine pleuro-pneumonia and Johne's disease, both of which have for years past been the cause of considerable mortality amongst Assamese cattle. These diseases have been under special study by the Institute and the conclusions reached are dealt with in the latest report of that institution.

A. O.

ACORNS, BEECH MAST, ETC., FOR STOCK FEEDING

The nut harvest is approaching and acorns and beech mast in particular are useful supplementary feed for stock. Prospects for the beech harvest this year are reported to be moderate to good in the North, South and South East, but poor to fair in the South West and poor in the East. The acorn crop is expected to be good in the South East, moderate in the South and North West, patchy in the East and poor elsewhere.

The County Garden Produce Committees set up by the Ministry of Agriculture have been requested to organise collections wherever there are nuts to gather and stock-keepers wish to obtain supplies; and the schools and youth organisations have been asked to help wherever practicable in making collections. Pig and poultry-keepers should, therefore, make their needs known at once to the Secretary of their County Garden Produce Committee (address obtainable from the Ministry at 23-25, Soho Square, W.1); or, alternatively, the Secretary to the County Federation of Women's Institutes may be able to assist. Prices suggested as being reasonable are 1s. 6d. a bushel or 3s. a cwt. for acorns, and up to half as much again for beech mast free from burrs. Advice on feeding to pigs is given in Growmore Leaflet 39 and to poultry in Growmore Leaflet 14 (Addendum), obtainable free and post free from the Ministry at Hotel Lindum, St. Annes-on-Sea, Lancs.

These publications also give advice about the feeding of horse chestnuts to pigs and poultry and of sweet chestnuts, hawthorn berries and the fruits of the mountain ash and dwarf elder to poultry. County Garden Produce Committees have been asked to arrange collections of these nuts and berries where stock-keepers advise them that they would like to have supplies.—*Ministry of Agriculture.*

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Nearly 5,000 new members and 125 new clubs have been added to the English National Federation of Young Farmers' Clubs during the past year. Clubs, it is stated, are now being formed at boarding schools and training colleges, as well as at elementary schools. Ages range from 10 to 21 years.

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There are three maxims vital to successful dairy farming. These are "Breed, Feed and Weed." The weeding out of animals which are not the best milkers is just as essential as the careful breeding and feeding.—Mr. John E. Moffitt, a member of Northumberland Agricultural Executive Committee.

QUESTIONS IN PARLIAMENT

Agricultural Research

Sir G. Jeffreys asked the Minister of Agriculture to what extent the membership or staff of the Agricultural Research Council is on a whole-time basis; how frequently it meets; and what funds have been made available to it to carry out its work during each of the past three years?

Sir J. Anderson: I have been asked to reply. Members of the Agricultural Research Council do not serve on a whole-time basis. The Secretary of the Council gives full-time service to the Council, but the whole-time services of the remainder of the staff are at present shared by the Agricultural Research Council and the Development Commission. The Council has also a small full-time scientific staff. The Council itself meets monthly, except in August and December. There are frequent meetings of committees and conferences of the Council. The grants in aid to the Council for the last three years have been as follows:—

Financial year	£
1940-41	58,571
1941-42	84,546
1942-43	125,000

The Council also advises the Agricultural Departments upon the much larger expenditure borne on their votes for the maintenance of Agricultural Research Institutes.

Captain Plugge asked the Minister of Agriculture what organisation exists to circulate to all concerned in this country the results of agricultural research and its application in countries overseas; and whether he will instruct the Agricultural Improvement Council to investigate the possibility of action in this direction?

Mr. Hudson: The results of agricultural research are disseminated in this country mainly through the research advisory and educational organisation set up by the Ministry. In addition, Press and broadcast news services are conducted and propaganda is carried out in other ways. A recent development has been the formation, for the purpose, of Demonstration Sub-Committees of County War Agricultural Executive Committees.

Prior to the war, overseas agricultural publications and abstracts of agricultural literature were generally available to research, advisory and educational workers; there were numerous meetings of international agricultural bodies; and other arrangements existed for securing contacts with agricultural scientific workers in overseas countries. These facilities have been drastically curtailed under war conditions, although the extensive abstracting and publication system operating under the auspices of the Imperial Agricultural Bureaux organisation is being maintained as far as practicable and is fully utilised. The Agricultural Improvement Council for England and Wales will include this matter in its consideration of the future arrangements for agricultural advisory work in this country.

Colonel Carver asked the Minister of Agriculture to what extent the Agricultural Improvement Council uses the services of the veterinary surgeons in getting the results of research applied and utilised by farmers in connection with livestock?

Mr. Hudson: Although the Agricultural Improvement Council for England and Wales is an advisory body, and therefore does not itself organise the application of the results of research in agricultural practice, it fully recognises the important influence of the veterinary profession in securing the rapid adoption of improved methods based on investigations concerned with animal health. The Director of the Ministry's veterinary laboratory, himself a veterinary surgeon, is a member of the Council, and leading members of the profession are included in the committee recently set up by the Council to supervise large-scale experiments in artificial insemination.

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Agricultural Improvement Council

Captain Plugge asked the Minister of Agriculture what is the present membership of the Agricultural Improvement Council; and how many are whole-time?

Mr. Hudson: For a list of the members of the Council I would refer my hon. Friend to the reply given to my right hon. and Noble Friend the Member for Horsham and Worthing (Earl Winterton) on June 12th, 1941. None of the members are whole-time.

Sir R. Gower asked the Minister of Agriculture what is the present authorised expenditure of the Agricultural Improvement Council in disseminating scientific and technical knowledge amongst practical farmers?

Mr. Hudson: The Agricultural Improvement Council for England and Wales is an advisory body and has no funds of its own. In carrying out its recommendations use is made of the organisation and funds already existing for these purposes.

Colonel CARVER asked the Minister of Agriculture how often the Agricultural Improvement Council meets; and whether its proceedings are available to the agricultural Press?

Mr. HUDSON: There have been three meetings of the Agricultural Improvement Council for England and Wales since its formation in June, 1941. Its work has been carried out largely by a number of standing and *ad hoc* committees which have met frequently. The proceedings of the council and its committees are confidential.

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LIVESTOCK

Mr. R. MORGAN asked the Minister of Agriculture whether he will bear in mind that if many farms are to grow full crops next year they will need to keep more livestock this winter; and whether he is endeavouring to keep alive as many cows as possible?

Mr. HUDSON: I am aware of the need for adequate stocking of land both to make full use of the grazing and rough fodder available and in the interests of next year's crops. Farmers are being asked to keep as many livestock, particularly cows, as their farms can support, and powers to direct increased stocking, where necessary, are conferred upon county war agricultural executive committees under the Livestock Control Order, 1942.

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NATIONAL WAR EFFORT: SCIENTIFIC AND TECHNICAL ADVICE

Rear-Admiral BEAMISH asked the Lord President of the Council what is the attitude of the Government towards the establishment of a central scientific and technical board proposed by the Motion now on the Order Paper in the name of the hon. Member for Chatham (Captain Plugge) and supported by the Association of Scientific Workers?

[*That this House is of the opinion that present circumstances require the early establishment of a whole-time Central Scientific and Technical Board to co-ordinate research and developments in relation to the war effort and to ensure that the experience, knowledge and creative genius of British technicians and scientists exert a more effective influence over the conduct of a highly-mechanised war.*]

Sir J. ANDERSON: In the view of the Government the best method of utilising the scientific resources of the country for the purposes of the war is to ensure that each Ministry or Department has available to it skilled service of the requisite quality and to provide for the necessary co-ordination by arrangements appropriate to the particular circumstances where the same or similar problems are the concern of more than one department. It is in pursuance of this conception that my right hon. Friend the Minister of Production has just added to his staff, on a whole-time basis, three men of scientific and technical eminence, who will work under the immediate supervision of the Lord Privy Seal acting for this purpose on his behalf.

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At an earlier date, Mr. STOKES had asked the Lord President of the Council whether he proposes to instruct the Scientific Advisory Committee to inquire into the higher direction of our scientific war effort?

THE LORD PRESIDENT OF THE COUNCIL (SIR JOHN ANDERSON): No, Sir. My right hon. Friend the Minister of Production has, however, had the benefit of the advice of the Scientific and Engineering Advisory Committees in the selection of three men of scientific and technical eminence whom he has recently appointed to his staff on a whole-time basis.

Mr. BELLENGER: Does my right hon. Friend understand that this matter should not be limited to one Department of State alone, but should be spread over the whole conduct of the war, and has he any statement to make in respect of that?

SIR J. ANDERSON: No, Sir.

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POST-WAR PLANNING: LAND UTILISATION IN RURAL AREAS

Mr. VERNON BARTLETT asked the Parliamentary Secretary to the Ministry of Works and Planning what steps the Government propose to take to implement the recommendations of the Scott Committee on Land Utilisation in Rural Areas?

THE JOINT PARLIAMENTARY SECRETARY TO THE MINISTRY OF WORKS AND PLANNING (Mr. HENRY STRAUSS): The recommendations in the Report of the Scott Committee relate to a wide range of important matters and concern a number of Departments. Close study of the recommendations and their implications is necessary before the action to be taken can be determined, and this is being undertaken.

Mr. BARTLETT: As this is a matter which is of very great importance to the country, will the hon. Gentleman see that the close study he referred to is carried out as expeditiously as possible?

Mr. STRAUSS: There will be no unnecessary delay, but if my hon. Friend studies the report he will realise the great number of Departments that are concerned—the Ministry of Agriculture, the Ministry of Health, the Board of Education, the Home Office, the Ministry of War Transport, the Ministry of Fuel and Power, the Board of Trade, the Ministry of Labour and the Service Departments.

Major LYONS: Is it not the case that a lot of the suggestions which have been made could well wait until the end of the war?

Mr. EDMUND HARVEY: Is it not a fact that the Committee have emphasised the urgency of legislation before the close of the war if their objects are to be carried out?

Mr. STRAUSS: Nothing in my answer negatives that view.

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UTHWATT COMMITTEE'S REPORT

Mr. HUTCHINSON asked the Parliamentary Secretary to the Ministry of Works and Planning when the Final Report of Mr. Justice Uthwatt's Committee will be published; and when he will be able to state what action he proposes to take on its recommendations?

Mr. H. STRAUSS: The report will be published to-morrow. In view of the complexity of the matters dealt with, the Government must carefully study both this report and the report of Lord Justice Scott's Committee before announcing their decisions upon them.

Mr. HUTCHINSON: Is there not a risk that, before legislation can be introduced, prejudicial action may be taken by interested parties?

Mr. STRAUSS: Legislation will, if necessary, be made to apply to conditions as they existed at the date of publication of the Report.

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MILK

Sir F. FREMANTLE asked the Minister of Health whether, as a result of the National Milk Testing and Advisory Scheme, commended by him to the local authorities in circular 2669, they are maintaining their work to ensure the cleanliness of the milk supply under the relevant orders and regulations; and whether there has been any improvement as a result?

Miss HORSBRUGH: The circular in question has only recently been sent out, but I have no doubt that local authorities will take all possible steps in the matter. With regard to the last part of the Question, my right hon. Friend is advised that although the scheme referred to has not yet come ito full operation, there has been a substantial reduction in the loss of milk through souring during this summer compared with last.

Sir F. FREMANTLE: Is the testing of milk that has to be done under another Department being carried on at the same time, and is it being worked in with the supervision by the local authority?

Miss HORSBRUGH: The circular has only been out a very short time, but I think the scheme is beginning to work satisfactorily.

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CIVIL SERVICE (RESPONSIBILITY)

Mr. PURBRICK asked the Financial Secretary to the Treasury whether, with a view to reducing the rigidity of mind and the habit of reference from one official in the Civil Service to another, he will decentralise responsibility, placing more responsibility on officals to act on their own initiative, making them more self-reliant and so speed up official methods?

THE FINANCIAL SECRETARY TO THE TREASURY (Captain CROOKSHANK): I cannot accept the generalisation in the first part of my hon. Friend's Question, but as regards his actual suggestion the responsibility for the organisation of Departments rests, of course, with the appropriate Ministers, and I am sure that they may be relied upon to take all the steps necessary for the speedy despatch of business.

Mr. PURBRICK: Are we to take it from that reply that the Government are opposed to rationing red tape?

Captain CROOKSHANK: I could not hear that.

The National Farmers' Union is supporting the Ministry of Agriculture's appeal to farmers to use national calf starter for calf-rearing in order to save milk. This starter, when introduced gradually (not before the third week) and used correctly, is said to save from 15 to 20 gallons of milk in the rearing of each calf, *i.e.*, a year's supply of milk for each human adult on the basis of next month's "ration."

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Lord Tankerville presided at the annual meeting of Chillingham Wild Cattle Association, when it was reported that the cattle—18 cows and heifers, 10 bulls and 4 calves—were in exceptionally good condition. No special feeding rations had been necessary, the herd having been maintained entirely on hay and oat straw obtained on the estate.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Sept. 20th.—Entries for Miss Aleen Cust Veterinary Research Scholarship (R.C.V.S.).

Sept. 23rd—25th.—N.V.M.A. Annual General Meeting and Conference, Holborn Restaurant, High Holborn, W.C.1. President's Reception, Waldorf Hotel, Aldwych, W.C.2 (Sept. 23rd); Annual Luncheon Mansion House, City of London (Sept. 25th).

Sept. 25th.—Meeting of the V.V.B.F. Ladies' Guild, Holborn Restaurant, Holborn, 10.30 a.m.

Oct. 1st.—Annual Meeting of the Central Veterinary Society, Conway Hall, Red Lion Square, W.C.1, 2.45 p.m.

Oct. 7th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at Edinburgh, 10.45 a.m.

Oct. 13th.—R.C.V.S. Council and Committee Meetings, Royal Station Hotel, York.

Oct. 14th.—R.C.V.S. Council and Committee Meetings, Royal Station Hotel, York.

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Conference Meetings at the Holborn Restaurant on Thursday and Friday, September 24th and 25th, 1942

THURSDAY, SEPTEMBER 24TH

10 a.m.—Annual General Meeting of the National Veterinary Medical Association.

Notice convening the meeting.

Welcome to Foreign and Colonial Delegates.

Presidential Address: "A National Animal Health Service."

Adjournment of meeting to Friday, September 25th, at 4.30 p.m. (not 4 p.m. as stated on the agenda for the Council meeting).

11 a.m.—Discussion on Inspection and Control of Meat and Milk.

Opener: Colonel E. M. Curley, V.C., Chief Veterinarian, U.S.A. Veterinary Division, European Theatre of Operations, followed on the meat side by Brennan DeVine, Esq., F.R.C.V.S., D.V.S.M., H. R. Tinney, Esq., B.V.SC., Veterinary Representative in London of the Commonwealth Government of Australia, and J. Campbell Hill, Esq., M.R.C.V.S.

Interval for luncheon, 12.30—2 p.m.

2 p.m.—Continuation of paper on Inspection and Control of Meat and Milk.

Discussion on the milk side led by H. E. Bywater, Esq., M.R.C.V.S., and S. J. Edwards, Esq., M.SC., M.R.C.V.S.

FRIDAY, SEPTEMBER 25TH

9.45 a.m.—Discussion on Preventive Medicine on the Farm.

Opener: Dr. Tj Bakker, representing the Netherlands Government, followed by H. W. Steele-Bodger, Esq., M.R.C.V.S., and Dr. R. Lovell, M.SC., M.R.C.V.S., D.V.S.M.

Interval beginning at 12.30 p.m. for luncheon at the Mansion House.

3.30 p.m.—Council Meeting of the National Veterinary Medical Association.

4.30 p.m.—Adjourned Annual General Meeting.

It will be greatly appreciated if members desirous of attending the luncheon at the Mansion House, who have not already applied for tickets, will do so, at the latest, by Wednesday next.

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SOCIETY OF WOMEN VETERINARY SURGEONS

Will members please note that, in view of the N.V.M.A. Conference of September 24th and 25th, the meeting of this Society which was to have been held in Birmingham on September 26th has been cancelled. The next meeting will be the Annual General Meeting in London on October 24th.—M. A. W. BENTLEY, *Hon. Secretary.*

PERSONAL

Appointments.—The following appointments in the Colonial Veterinary Service are announced: Mr. M. P. Ford, M.R.C.V.S., and Mr. A. E. G. Markham, M.R.C.V.S., both as Veterinary Officer, Kenya.

Birth.—September 6th, 1942, to Gwendolen, wife of A. S. Harris, M.R.C.V.S., Barnard Castle, Co. Durham, the gift of a daughter (Gillian).

Marriage.—KING—GUDGIN.—At St. Mary's, Northchurch, on September 12th, 1942, John Oliver Letts King, B.SC. (AGRIC.), M.R.C.V.S., elder son of Mr. and Mrs. R. O. King, Harrogate, Yorks, to Helen Marion, only daughter of Mr. and Mrs. H. F. Gudgin, Berkhamsted, Herts.

NORVAL—TURNBULL.—At the Scotia Hotel, Edinburgh, on September 12th, 1942, by the Rev. Albert Deack, John Norval, M.R.C.V.S., youngest son of Mr. and Mrs. W. R. Norval, Stanley, Perthshire, to Mary Dalgleish, youngest daughter of Mr. and Mrs. J. E. Turnbull, 15, Eildon Street, Edinburgh.

Forthcoming Marriage.—GIBBS—DYKE.—The engagement is announced between William A. Gibbs, M.R.C.V.S., eldest son of Mr. and Mrs. W. A. Gibbs, Preston, Brighton, and Barbara Dyke, M.R.C.V.S., only daughter of Mr. and Mrs. F. M. Dyke, Branksome, Boreham Wood, Herts.

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R.C.V.S. OBITUARY

BURSTON, Clement, St. Neots, Hunts. Graduated Edinburgh, April 13th, 1882. Died August 7th, 1942; aged 78 years.

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B.M.A. ANNUAL REPRESENTATIVE MEETING

"GROUP PRACTICE A FEATURE OF ANY FUTURE MEDICAL SERVICE"

At the Annual Representative Meeting of the British Medical Association, held in London last week, the draft interim report of the Medical Planning Commission was received. The meeting accepted the following broad definition of the objects of medical service:—

To provide a system of medical service directed towards the achievement of positive health, of the prevention of disease and the relief of sickness; to render available to every individual all necessary medical services, both general and specialist, and both domiciliary and institutional.

It was agreed that in any reorganisation of general practice as full a measure as possible of free choice of doctor and patient should be preserved. It was also agreed that group practice should be a feature of any future medical service, provided that it does not involve the introduction of supervisory control in clinical matters. Groups should not be formed arbitrarily by any outside authority. They should be arranged by the doctors themselves.

The meeting adopted a proposal that provision of medical service of whatever character should be made by the Government for the whole community. A proposal that the basis for the co-ordination and integration of health services should be the establishment of a whole-time salaried Government medical service was rejected by an overwhelming majority. The meeting expressed the view that central machinery in the future medical service should take the form of a corporate body.

PRESIDENT'S VIEWS

Sir Beckwith Whitehouse, the new President, in his address, said that while recognising the necessity of a co-ordinating body and admitting the immense services which the Ministry of Health had contributed to the nation's health, he had viewed with some apprehension the inroads that had been made in recent years on the influence of that traditional link of British medicine—the family doctor and his patient—and the swing towards State medicine. "I am convinced," he said, "that neither the people of this country nor the bulk of the medical profession desire to become the regimented units in a system of bureaucratic control." If in all subsequent discussion and future legislation designed for the betterment of national health the sacred bond which existed in Great Britain between the doctor and his patient was not lost or broken, then the main suggestions of the Planning Commission could bring nothing but good, and it should be their duty to implement the proposals willingly, if and when they were asked to do so. The alternative was a system of salaried State medical service, which he believed to be detrimental to the national health and the personal interests of patient and doctor alike.

NATIONAL MILK TESTING AND ADVISORY SCHEME

In accordance with the Government Policy for the Milk Industry announced in the White Paper (Command 6362) of June 3rd, 1942, the Ministry of Agriculture, through its Advisory Committee, is continuing to develop arrangements for the sampling and testing of milk to improve the keeping quality of the national milk supply, for the establishment of a more complete advisory service to milk producers and the dairy trade, and ultimately for providing for the payment of milk on a quality basis.

The Technical Sub-Committee of the Advisory Committee has given special attention to the methods of sampling and testing to be adopted, and to the problems of obtaining and licensing the necessary laboratories and of providing the trained staff required to carry out both the testing and general supervision of this work. The detailed technique for a standard platform rejection test has been issued, and copies may be obtained from the Ministry of Agriculture and Fisheries, Lindum Hotel, St. Annes-on-Sea, Lancs.

The technique is based on the resazurin ten-minute test as a platform rejection test for detecting milk of poor quality.

The interpretation of the test is to be as follows:—

With a reading of 4 or higher under the ten-minute resazurin disc reading the milk will be accepted.

Readings from 3½ to 1 (both inclusive): salvaged if possible, otherwise rejected.

Readings ½ and 0: rejected.

Every churn of milk must be examined by smell, and any churn of which there is the slightest suspicion must be set aside for testing.

Milk with pronounced taints likely to affect the bulk should be rejected, even though the results of the test are satisfactory.

It is hoped that with the introduction of the new producer's contract with the Milk Marketing Board on October 1st most of the larger creameries, milk depots and processing dairies will be duly equipped with licensed laboratories and the necessary certificated testing staff, but a further period must elapse before sampling and testing facilities can be made generally available for the smaller units. It has, therefore, been decided that a system of price payment according to quality cannot be introduced next October, but the new contract has been drawn so as to enable this to be operated next summer if it is then found to be practicable.

Milk buyers will continue to exercise the right to reject unsatisfactory consignments of milk as they have hitherto done; and meanwhile the measures now initiated will be developed with a view to the establishment of as complete a check as possible on summer souring of milk next year. County War Agricultural Executive Committees, for their part, are completing their arrangements for advisory work based on the results of the tests made under the scheme. Steps will also be taken to safeguard against the keeping quality of producers' milk being adversely affected by transport and churn cleansing difficulties at creameries and milk receiving depots.

Although the scheme has not yet been applied universally there has been a substantial reduction in the loss of milk from souring this summer compared with last. This indicates an improved general standard of milk production, showing that both producers and the dairy trade are co-operating through the scheme to the desirable end of securing improvement in the nation's milk supply.

The immediate emphasis has been laid on the control of summer souring by tests made during the warmer months, and the application of price differentiation, based on the results of those tests. But it is generally accepted that a system of prevention involving testing at regular intervals throughout the year accompanied by the necessary advisory services is the soundest on which to build permanently a clean milk supply. The Ministry, therefore, proposes to encourage this system of regular sampling and testing in all laboratories licensed under the scheme and to investigate by practical experiments throughout the country the problem of providing similar facilities for producers' milk supplies which are not delivered to creameries, etc., with licensed laboratory facilities. A system of this kind would, it is hoped, eventually result in the prevention of the undue incidence of souring at any season of the year, and would enable all producers of milk, including producer-retailers, to be brought within and enjoy the benefits of the scheme.

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Commenting on the above scheme, the introduction of which has been dealt with in our columns, *The Lancet* says, in reference to the official document embodying its terms, that circular 2669 of the Ministry of Health is solely concerned with milk as a perishable food. "Its aim is to reduce loss of milk from souring or tainting and to safeguard the keeping quality of bulked market milk. It proposes to do so by instituting a system of examinations of milk using certain standard tests. These as far as practicable will be carried out in trade laboratories, but under the control and supervision of the provincial dairy bacteriologists, who are already in existence. These bacteriologists will arrange for frequent check tests to be made by their staff. The actual tests to be used are not disclosed. Three categories of producers' milk are proposed—'market' milk, satisfactory for the liquid milk market; 'salvage' milk, unsuitable for the liquid market; and 'rejected' milk, to be returned to the farmer. Salvage milk will be at the disposal of the Ministry of Food, who will whenever practicable arrange for its salvage, manufacture or disposal, and who will determine the price to be paid for it. (If salvage is impracticable the milk will be returned to the producers.) While the scheme will mainly be applied to depot or creamery bulked milk all supplies of milk, including designated milks, delivered from farms will be liable to test. This scheme is, however, additional to existing regulations including those for designated milks, and the Minister asks local authorities to maintain their work under these various orders and regulations. The advisory work will be undertaken by the county war agricultural executive committees through their demonstration sub-committees. The scheme involves price differentiation on a quality basis, prices being decided by the Ministry of Food in consultation with the Milk Marketing Board. Milk legislation is already very complicated and this scheme adds to the burden already on the shoulders of the farmers and milk producers. That it should be necessary is part of the penalty to be paid because Government departments have shirked handling the milk problem firmly. Procedures have been adopted which do a little good at the expense of much administrative effort, but never go to the root of the problem. The latest Government action is intended to conserve milk from becoming unsaleable, but leaves untouched the need for making it safe from the risk of spreading disease, in spite of urgent medical representations. Much of the extra milk now allocated to young children and school-children is just 'milk,' like Hamlet's father unanel'd, no reckoning made but sent with all its imperfections on its head. Some part of the increase of human tuberculosis during the present war may turn out to be due to the greater consumption by children of milk infected with the bovine bacillus. Where pasteurisation of milk for schools is impracticable it would probably be better to supply dried milk."

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THE HIGHLANDS AND ISLANDS VETERINARY SERVICES

The Department of Agriculture for Scotland, in co-operation with the County Councils in the seven crofting counties are subsidising a service known as The Highlands and Islands Veterinary Services Scheme. Under this scheme assistance is given from State funds towards the provision of veterinary services for the stock of crofters, small landholders, etc., in the congested districts. The subsidy includes an annual grant paid by the Department through the County Councils to make good the loss the practitioners will incur when they give their services at the reduced fees payable by those eligible to participate in the scheme.

Veterinary Officers have been appointed by the County of Inverness, as follows:—

Inverness, Aird and Badenoch Districts.—Capt. R. K. Kent, M.R.C.V.S., 51, Eastgate, Inverness.

Lochaber District (including the Ardnamurchan District of Argyllshire and the Islands of Eigg, Rhum, Muck and Canna).—Mr. Wm. A. Curley, M.R.C.V.S., Cameron Square, Fort William.

Skye District.—Mr. John Finlayson, M.R.C.V.S., Rosedale, Beaumont Crescent, Portree.

Outer Island Districts, *i.e.*, North Uist, South Uist, Benbecula and Barra, including the small isles adjoining.—Mr. Alexander N. MacLeod, M.R.C.V.S., Milton House, Lochboisdale.

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DEEP-SEATED HILL FARMING TROUBLES

"It is comparatively easy to detail the many facts which imperil the industry," says *The Scottish Farmer* in its issue of August 29th. "Thousands of acres are exhausted, the bracken flourishes, drains have ceased to exist, roads are bad with all that that entails in poorer quality of service and lack of supplies, housing is poor and disease is prevalent. Pitifully little has been done to help the crusade against the bracken and drainage, but veterinary science with its serums and vaccines is slowly making headway against disease. If the hill land is to be a source of food, and not just a playground, the crying post-war needs are roads and modern housing, and the latter is dependent on the former. If these are supplied many difficulties disappear. The shepherd's wife does not believe in a 'public school' education, but she is being increasingly forced to board out her children. If the sheep industry is to remain on the hills a long-term policy is bound to be expensive. Meantime, the industry should be re-injected to carry on during war producing the maximum food under present conditions."

SCHEME FOR THE CONTROL OF DISEASES OF DAIRY CATTLE

STATEMENT SHOWING THE NUMBER OF UNDERTAKINGS NOTIFIED TO THE MINISTRY OF AGRICULTURE DURING THE WEEK ENDED SEPTEMBER 12TH, 1942

County	Undertakings Notified		Total Undertakings		
	During Week	Previously	Number	Number of Cattle	
				Cows	Heifers
ENGLAND					
Bedford	2	21	23	609	426
Berks	1	33	34	1,127	758
Bucks	2	25	27	720	530
Cambridge	1	8	9	185	92
Chester	10	188	198	7,158	2,401
Cornwall	—	—	—	—	—
Cumberland ..	—	20	20	623	574
Derby	6	84	90	2,754	1,682
Devon	3	69	72	1,261	817
Dorset	4	21	25	824	559
Durham	4	116	120	2,832	776
Essex	5	102	107	4,602	2,641
Gloucester	2	39	41	1,474	835
Hampshire	10	140	150	4,802	3,019
Hereford	1	11	12	226	99
Hertford	—	36	36	1,203	796
Hunts	1	3	4	66	45
Isle of Ely	1	—	1	1	8
Isle of Wight ..	—	4	4	55	15
Kent	—	58	58	1,218	751
Lancs	1	87	88	2,681	796
Leics	2	29	31	848	545
Lincs (Holland) ..	—	4	4	45	11
„ (Kesteven) ..	1	7	8	84	61
„ (Lindsey) ..	4	24	28	528	210
Middlesex	—	2	2	83	4
Norfolk	3	101	104	3,080	2,033
Northants	2	32	34	958	815
Northumberland ..	1	36	37	1,145	598
Notts	6	32	38	1,041	516
Oxford	1	15	16	433	537
Rutland	—	6	6	110	68
Salop	2	124	126	4,213	1,991
Soke of Peterborough	—	—	—	—	—
Somerset	6	61	67	1,835	743
Staffs	1	93	94	2,864	1,412
Suffolk, East ..	3	36	39	965	693
„ West ..	1	21	22	414	279
Surrey	2	54	56	1,567	696
Sussex, East ..	5	78	83	2,201	1,141
„ West ..	1	56	57	1,724	1,100
Warwicks	1	66	67	1,682	1,089
Westmorland ..	5	8	13	272	327
Wilts	—	33	33	1,455	654
Worcester	6	88	94	2,117	980
Yorkshire, E.R. ..	7	20	27	488	238
„ N.R. ..	—	57	57	1,218	669
„ W.R. ..	11	110	121	3,237	1,132
WALES					
Anglesey	2	8	10	191	64
Brecon	—	2	2	25	9
Caernarvon ..	10	67	77	1,385	659
Cardigan	1	11	12	170	119
Carmarthen ..	3	128	131	2,481	1,283
Denbigh	—	31	31	670	312
Flint	3	56	59	1,314	620
Glamorgan	2	39	41	614	254
Merioneth	2	5	7	81	72
Monmouth ..	—	15	15	432	230
Montgomery ..	—	4	4	132	118
Pembroke	1	56	57	1,138	716
Radnor	—	—	—	—	—
TOTALS ..	149	2,680	2,829	77,661	40,618

Note.—Of the total of 2,829 undertakings notified to date 768 are for 1 year 165 are for 2 years, and 1,896 are for 3 years.

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ARTIFICIAL INSEMINATION: SOME ADVANTAGES AND DISADVANTAGES

The advantages and disadvantages of artificial insemination of livestock are given as follows by Dr. E. E. Hancock, provincial veterinarian of Nova Scotia, states *The Scottish Farmer*:—

Advantages

1. The usefulness of superior sires may be increased manyfold; a proven sire with ability to transmit characters for high milk and butter fat production may be used to breed several hundred cows annually.

2. Small breeders who would of necessity have to buy a bull (often of mediocre breeding) within their means, may dispense with the keeping of a bull and through the use of artificial insemination, participate in the use of a bull of outstanding merit at a lower cost.

3. The transmitting ability of a bull may be determined quickly and effectively.

4. The danger of spreading genital diseases is materially reduced.

5. Valuable sires which, because of injury, are unable to serve cows, may be continued in service.

6. Yearling heifers and small cows may be bred to large, heavy sires without danger of injury.

7. Because of the regular examination of the semen, infertile bulls are likely to be detected earlier than with natural breeding; also abnormalities of the cow's genital tract which may lead to shy breeding, may be discovered earlier.

8. In most cases better breeding and calving records will probably be kept.

9. Line-breeding and the development of certain large families of superior dairy cattle within a community is possible.

10. The participation in a breeding programme and the study of breeding problems by a large number of co-operative dairy farmers should bring forth the best community spirit for the advancement of the dairy cattle industry.

Disadvantages

1. Artificial insemination requires a well trained operator and special equipment.

2. It requires somewhat more services than does natural breeding, which tends to limit its use to large herds or well organised co-operative projects.

3. All equipment and instruments used must be clean or infection may spread; proper cleaning facilities for instruments must be available.

4. The extended use of sires by this metthod may result in fewer purchases of bulls by small breeders and breeding establishments may suffer consequent loss of income.

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MAXIMUM PLOUGHING-UP

"MARRIAGE" OF HORSE AND MECHANICAL POWER DESIRABLE

In connection with the Ministry of Agriculture's exhortation to farmers to "plough the clock round," *The Farmer and Stock-breeder* observes: "Mechanical horse-power is not the only form of power. In 1938 we had, in England and Wales, over 800,000 work horses and over 100,000 unbroken colts. These, too, must be used to the full. For more years than they like to recall, horse-breeders carried on despite discouragement, culminating in the withdrawal of stallion grants at the outbreak of war. True, the grants have since been restored; but the action is not a pleasant memory, and breeders may well ask why horses receive no attention in official calculations of our cultivating potentialities. In Shires, Punches and Clydesdales we have draught horses that are the envy of the world. There is, too, labour available to work them—labour not readily adaptable to mechanisation. There are, also, many light horses that could well be put to the plough. While there are still men left who remember how to handle three-, four-, or even six-horse teams, they should be used. In effect, they represent a small insurance against drastic fuel shortage. Perhaps it is due to apparent official apathy towards horses that on many farms with tractors there are two or three horses that feel the collar only for relatively short periods of carting. It is not reactionary to see that every horse pulls his weight on every suitable day. The happy 'marriage' of horse and mechanical power is worth exploration. And organisation is the keynote."

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PENICILLIUM

"Some thirteen years ago," says *The Times* in a recent issue, "the discovery was made that a mould, *Penicillium notatum*, possessed strong anti-bacterial powers. Study of the mould was continued in Oxford and the further discovery achieved that purified preparations are much more richly endowed with bactericidal properties than is the crude substance. A preparation of *Penicillium* has been found to inhibit the growth of staphylococci completely in a dilution of 1 in 25,000,000 and partially in a dilution of 1 in 160,000,000. An additional advantage is the harmlessness of the drug. In experiments on mice no ill effects were observed, though very large doses were given, and doses given to human beings seemed to be innocuous. Thus the hope emerges that it may be possible to produce and maintain in the blood a sufficient concentration to bring some at least of the organisms of disease under therapeutic control. The prospect is certainly an alluring one, especially when it is borne in mind that penicillin is many hundred times as active as the sulphonamides which, in recent years, have so largely dominated the field of treatment.

"Penicillin has, in fact, been found to be active against certain organisms which have resisted the influence of the sulphonamides. Such activity may very well constitute its most important quality, because, as things stand at present, organisms resistant to the

sulphonamides are, for the most part, beyond the reach of treatment. In any case penicillin is less toxic than the least toxic of the sulphonamides and seems to act without reference to the number of bacteria present. Efforts are now being made to obtain the active principle of the drug in crystalline form since—as the *Lancet*, which recently discussed the subject fully, points out—it is not yet certain that the maximum degree of purity has been achieved. There are, however, many difficulties in the way and further hopes of obtaining a synthetic product are not very bright. This is perhaps immaterial seeing that the mould itself is available. There will be general agrement with the plea of the *Lancet* that, 'in view of its potentialities, methods for producing penicillin on a large scale should be developed as quickly as possible.'"

. . . . .

Following publication of the above editorial note, most of the London newspapers have drawn the attention of their readers to the remarkable properties of this substance. Its availability for therapeutic use is, however, not yet on a large scale, as was pointed out, in a subsequent letter to *The Times*, by Dr. F. H. Carr, Chairman of the Therapeutic Research Corporation, Ltd. Dr. Carr states that as penicillin is unstable under many conditions it has been necessary to investigate means of rendering it stable during the process of manufacture before laying down a large plant for its production. In the near future it is hoped to publish the results of completed work, in which the staffs of certain American firms have collaborated.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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STUTTGART DISEASE, ETC.

Sir,—Your correspondent Alastair Worden quotes a statement I recently made, that "in many ways acute Stuttgart disease was scarcely to be differentiated from the disease they called haemorrhagic enteritis." If I read his letter correctly, he differs from that view, and, of course, he is entitled so to do. Yet he admits he has never yet seen a case of "so-called Stuttgart disease."

Your correspondent would like to read a clinical account of it. May I, therefore, direct him to page 163 of my "Index of Diagnosis" published by Baillière Tindall and Cox. I think, too, he would be interested to read pages 30 and 31 dealing with haemorrhagic enteritis.

Regarding his remarks on pyorrhoea and his wish for evidence that this exists commonly among greyhounds, I think your correspondent will be readily assured upon this point by all practising canine surgeons—because all of them know that any breed of dog which is habitually fed on soft or sloppy food, and is not encouraged to gnaw or bite its food, or use its teeth as Nature intended, is bound eventually to suffer from congested gums, gingivitis, alveolitis and/or pyorrhoea. Observation in general practice is the best evidence. Here I could well refer to the works of the late Henry Gray, who first drew attention to this fact, and whose opinions were universally respected.

Yours faithfully,
HAMILTON KIRK.

658, Finchley Road,
N.W.11.
September 8th, 1942.

. . . . .

Sir,—Round about 1897 and 1898, when Professor Penberthy was alive, I saw several cases of the above malady in Norfolk in which the lesions were confined to the tongue and consisted of erosions and plaques. There were several references to this disease in issues of *The Veterinary Record* of those years and some by Professor Penberthy. Since then the incidence of Stuttgart disease seems to have declined, at any rate in its glossal form. This is not strange to those who know how epidemics vary in their virulence and symptoms as years pass on, *e.g.*, gastritis, showing the vomiting of blood without the anal passage of blood, is far more common as a disease *per se* than gastro-enteritis which is generally due to the ingestion of dangerous and damaging bones. There is an oral disease of dogs which in my opinion has not yet been named and docketed and which requires further bacterial investigation and research: it may be due to avitaminosis.

I have only seen one case of *real blue tongue* in this country in a somewhat extensive canine practice. I think it would be difficult to prove that greyhounds are specially liable to pyorrhoea.

Yours sincerely,
G. MAYALL.

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STATISTICS RELATING TO THE INCIDENCE OF ANIMAL DISEASES

Sir,—I have been asked by the Editorial Committee of the N.V.M.A. to express in the form of an open letter certain opinions which have hitherto been communicated to it privately.

A recent correspondent requested information on the relative incidence and severity of cancer in dogs, pre-war and now. Whatever replies he may receive, he is likely to gain "impressions" and not hard facts. Except for returns of notifiable diseases, and all-too-rare scientific and clinical papers dealing with the subject, we are woefully ignorant of the relative incidence in Great Britain of disease in both farm and pet animals. The excellent summaries published by German veterinary colleges—such as were abstracted in the issue of September 5th, 1942—are an indication of what could be accomplished in this country.

Would it not be possible for the N.V.M.A. or some other responsible body to appeal for information from animal hospitals and clinics, from advisory services, and from such practitioners as keep case records? There must be many such records worthy of correlation and analysis, and much of the task of dealing with them could be carried out by voluntary helpers. When it appeared recently that a certain volume of clinical data would be made available for such a study, no fewer than ten people—mostly young graduates—volunteered to assist.

I am, Sir,
Your obedient servant,
ALASTAIR N. WORDEN.

St. John's College,
Cambridge.
September 9th, 1942.

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MYOGLOBINURIA IN YOUNG HORSES AND THE "BARKING" OF OAK TREES

Sir,—With reference to myoglobinuria in young horses on poor pasture associated with the "barking" of oak-trees, described in your issue of August 29th, Lander, in his "Veterinary Toxicology" (1912 edition), p. 270, gives the following among symptoms of oak-leaf poisoning: "Fever and nervous symptoms of collapse and in particular very dark urine varying from red to deep wine-red"; and "besides gastro-enteritis there is nephritis . . . urine dark, albuminous, free of sugar, and bloody."

Yours faithfully,
A. S. LEESE.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV)

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Aug. 1st to 15th, 1942	10	92	—	—	15
Corresponding period in—					
1941 ...	12	1	2	3	24
1940 ...	17	5	—	6	227
1939 ...	17	—	—	7	110
Total Jan. 1st to Aug 15, 1942	210	203	26	118	280
Corresponding period in—					
1941 ...	302	258	14	142	881
1940 ...	339	24	15	124	2,764
1939 ...	527	44	31	164	1,448

NOTE.—The figures for the current year are approximate only
*** Excluding outbreaks in Army Horses.**